EXHIBIT M

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE, INC., Petitioner, vs. COREPHOTONICS, LTD., Patent Owner.	IPR2020-00905 IPR2020-00906

VIDEOTAPED VIDEOCONFERENCE DEPOSITION OF

EXPERT WITNESS

JOHN C. HART, Ph.D.

April 29, 2021

9:02 a.m. (CST)

Reported By:

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INDEX OF EXAMINATION

WITNESS: JOHN C. HART, Ph.D.

---------- REFERENCED DOCUMENTS ----------

DEPOSITION OF JOHN C. HART, Ph.D. - April 29, 2021

THE VIDEOGRAPHER: We are on the record on April 29, 2021, at approximately 9:02 a.m. Central time for the remote video deposition of Dr. John Hart in the matter of Apple, Inc. versus Corephotonics Ltd., IPR No. 2020-00905 and 2020-00906.

My name is Valerie Beltran, and I am the videographer.

Will counsel please introduce themselves for the record, beginning with the party noticing this proceeding.

MS. SIVINSKI: Good morning. My name is Stephanie Sivinski, with Haynes and Boone, for Apple. And I'm joined today by my colleagues Mike Parsons and Bethany Love, also with Haynes and Boone, and then Priya Viswanath from Cooley LLP.

MR. LINK: My name is Jonathan Link with the law firm of Russ, August & Kabat, on behalf of the Patent Owner, Corephotonics.

THE VIDEOGRAPHER: Thank you.

Will the court reporter please swear in the witness.

THE REPORTER: I'm going to ask that you

used for. I guess I'm trying to find out how -- how you would do image fusion, as taught by the '479 patent.

A. So image fusion is further elaborated in Figure 3 and the remainder of column 7 into column 8 and column 9 to discuss some of the details of -- of image fusion. There are further details on image fusion elsewhere in the -- in the patent as well.

MR. LINK: Counsel, we've been going about an hour 10, hour and 15 minutes. So when you have time for a break, that would be great.

MS. SIVINSKI: Okay.

BY MS. SIVINSKI:

Q. So you mentioned that with respect to Parulski, you were describing combined images in that context to be mapping the X/Y position of a pixel in one image to the X/Y position of a pixel in another image, right?

A. When I was speaking about Parulski, those X and Y values were identical; so the mapping would be the identity mapping.

An X/Y position in the final image would correspond to the exact same X value and Y value in the Tele image and would correspond to an X and Y value in a sub-rectangle, sub-quadrilateral of the

Wide angle image.

Q. And your position is that fusing images, as discussed in the '479 patent, requires something more than that, right?

A. Yes.

Q. But fusion, with respect to the '479 patent, requires using pixels from one image and putting those pixels into the other image, right?

MR. LINK: Objection. Vague.

A. I believe the 479 talks about an output image. So that's a third image. You're not taking pixels from one of the -- from the Tele image and placing them in the Wide image or vice versa. You're creating a -- an output image.

Q. Does the output image, as described in the '479 patent, contain pixels from both the original Wide image and the original Tele image?

A. I'm not sure what you mean by "pixel," does it contain a pixel.

What I was describing in Parulski, the -- that combination in Parulski, the pixel locations were identical. The X/Y coordinate in one corresponded to the X and Y coordinate in the Tele image or the corresponding X and Y coordinate where X and Y are equal to each other in that portion of

the Wide angle image.

I don't -- that's not the case with -- that doesn't suffice for what is described as "image fusion" in the '479. So you're using language I've used to refer to a combination in Parulski that doesn't apply using those same terms and that same context when looking at image fusion in the '479.

Q. I think you misunderstood my question if you thought I was referring to Parulski. I am talking about just image fusion, as it is taught in the '479 patent. I am not talking about Parulski.

So with that context, let me re-ask my question.

The '479 patent describes an output image, right?

A. Yes.

Q. And the output image is a combination of both the Wide image and the original Tele image or a fusion of those images, right?

A. The '479 talks about the fusion of those two images.

Q. Okay. And the fused image is the output image that we've been talking about, right?

A. Yes.

Q. Okay. That fused output image is going

to have portions of the Wide image and portions of the Tele image, right?

A. I'm not sure what you're referring to as "portions." I believe you're using the data from the Tele image and the Wide image to produce the fused output image.

Q. Okay. So you'll agree with me that if we use the word "data" -- you like that word better.

Okay. So let me re-ask my question using the word "data."

Does a fused output image, as described in the '479, have data from the Wide image and data from the Tele image?

A. So it is not a matter of personal preference on these terms. These are terms describing very specific methods in -- in the '479.

When you say "have data," the data is used to form the output image. The output image has its own data. There's -- the output image consists of data for that output image.

The input image consists of data for both the Tele image and the Wide angle image. The data that's in the Tele image and the Wide angle image is used in forming the data on the output image, but it is not like you're taking a bite here

and putting it over here. You know, the values may be different. The data values themselves may be different.

So it is not a manual operation of taking something from one location and putting it someplace else. These are computations.

So you take data at the beginning as an input to the computation. You perform the computation, and you get output data. And that output data in this case is used for the fused image.

Q. In order to generate a fused image, you need both data from a Tele image and data from a Wide image, right?

A. That's what the '479 indicates for image fusion, yes. It operates on a Wide image and a Tele image.

Q. Thank you for answering my question.

MS. SIVINSKI: Okay. I think we can take a break now. Let's go off the record.

THE VIDEOGRAPHER: The time is 11:40 a.m., and we're going off the record.

(Recess taken.)

THE VIDEOGRAPHER: The time is 12:02 p.m., and we're back on the record.

BY MS. SIVINSKI:

Q. Okay. Welcome back, Dr. Hart.

So we have been talking about what "fusion" means in the context of the '479 patent. And I want to look at a particular portion of the '479 specification in column 9, the description of Figure 5, which starts at line 39.

A. Did you say column 9?

Q. Yes.

A. Okay.

Q. And do you see the paragraph that starts describing Figure 5 at line 39?

A. Yes.

Q. Okay. Are you familiar with Figure 5 of the '479 patent?

A. Yes.

Q. Okay. So that paragraph describes, on line 47, it says:

"In registration step 506, mapping between the Wide and the Tele aligned images is performed to produce a registration map..."

Do you see that?

A. Yes, I see that.

Q. Okay. And what does it mean to have

produced a registration map?

A. A registration map would be the location -- you know, for a given image, say the Tele image, it would be the location in the -- let's -- yeah, let's -- let's do the -- from the Wide to the Tele.

So for each pixel in -- in the Wide image, for -- in a portion of the Wide image, it would tell you where that corresponding picture -- pixel was located in the Tele image.

Q. Okay. With respect to Parulski, earlier you said you were mapping the X/Y coordinates of one pixel to the X/Y coordinates of the other.

Is this the same concept or a different concept?

A. Well, the term "map" is being used in two different -- is referring to two different approaches. In Parulski, the term there is "combination" of two images. And following what Parulski is describing there, the map would simply be an identity. The X and Y coordinate of the two pixels would be identical.

And in Parulski -- let me find Parulski here. So Parulski talks about taking one of the images and cropping and up-sampling it before being

used.

And so after that cropping and up-sampling, so that the image as a whole was -- you know, the quadrilateral portion of one image was corresponding to the entirety of the other image, quadrilateral in the Wide angle image was corresponding to the entirety of the Tele image. After that cropping and up-sampling process, then the pixels would be identical if you're just simply doing a simple combining.

So -- so the map that's described in -- in the '479 is not the identity. They're talking about a registration map constructed using image rectification.

Q. So then it says further down that you -- in resampling step 508, you resampled the Tele image according to the registration map.

Do you see that?

A. Hang on a second. I'm hearing some -- hold on one second.

THE VIDEOGRAPHER: Do you want to go off the record?

THE WITNESS: Yes. Off the record.

THE VIDEOGRAPHER: The time is -- the time is 12:07 p.m., and we're going off the record.

(Recess taken.)
THE VIDEOGRAPHER: The time is 12:08 p.m., and we're back on the record.
BY MS. SIVINSKI:
Q. Okay. So the next step that this paragraph describes is resampling step 508, where you generate a resampled Tele image, right?
A. I see that -- that line, yes.
Q. And then the next step is decision step 510, right?
A. I see that step, yes.
Q. Okay. And then you have fusion step 512, right?
(Witness reviewing document.)
A. Yes, I see that step.
Q. Okay. So at line 54, column 9, the '479 patent teaches that:
"In more detail, in step 510, the re-sampled Tele image is compared with the Wide image data and if the comparison detects significant dissimilarities, an error is indicated. In this case, the Wide pixel values are chosen to be used in the output image."
Do you see that?

A. Yes, I do.
Q. Okay. What happens if an error is not detected?
(Witness reviewing document.)
A. It depends on what operation is being performed. So it would depend. It's -- it's -- that's simply stating that the Wide pixel values are being used if -- if there seems to be an error in that registration step. Then by default, it would use the Wide pixel data instead of the Tele pixel data.
Q. Okay. Well, if there's no error, then it generates a fusion image, right?
A. Right. Either way, it will generate a fusion image. It's going to use the Wide pixel values if that -- if it detects an error due to significant dissimilarities.
Q. Well, will the fusion image contain pixel values from both the Wide image and the Tele image?
A. Yes. It will use pixel values in the determination of the -- it will -- it will -- it will look at the pixel values from both images in determining the pixel values of the output image.
Q. Okay. Well, so if there's an error,

then it will use Wide pixel values in the output image, right?
A. Yes, that's what it says.
Q. Okay. But you can also generate a fused image that will contain Wide -- that uses Wide pixel values and Tele pixel -- Tele pixel values, correct?
A. Yes, that's what it says.
Q. So I want to look at a portion of your Declaration. If you will turn with me to paragraph 63. Let me know when you're there.
A. Okay. Paragraph 63.
Q. Okay. So you're talking about the range map disclosed by Parulski here, right?
A. Yes.
Q. Okay. And you say in the last sentence on page 33:
"The first three examples all involve identifying object boundaries or motion tracking of objects, which does not have anything to do with fusion, per se."
Do you see that?
A. Yes, I do.
Q. Okay. What do you mean by "per se" in paragraph 63 of your Declaration?
A. So those first three items, (a) through

(c), at the bottom of column 20, there's a list in Parulski. The first one is -- this sentence says:
"The range map is then used to modify the captured image signal or the output image for a variety of purposes, such as ... to improve object identification ... to enable object extraction ... [or] to enable motion tracking."
Those three features do not represent a combination of two images. They're operations that you would perform on a single image. You would identify an object in a single image; you would figure out the continuous boundaries of an object in a single image; you would enable motion tracking of objects within multiple images by identifying that boundary of the object between images.
And those -- motion means that the object is moving. So this would be subsequent images from a single sensor. This would not be the fusion of two images from -- taken simultaneously to do motion tracking. You're tracking the motion of something that's moving through time.
Q. Why would a POSITA want to enable object extraction?
MR. LINK: Objection. Beyond the scope.